



ART. V.—1. *Records of the School of Mines and of Science applied to the Arts.* Vol. I. Part I. Published by order of the Lords Commissioners of Her Majesty's Treasury. Longman and Co.

2. *The First Report of the Commissioners for the Exhibition of 1851.* To the Right Hon. Spencer Horatio Walpole, &c. &c., one of Her Majesty's Principal Secretaries of State.

3. *History of Adult Education, in which is comprised a Full and Complete History of the Mechanics' and Literary Institutions, Athenaeums, Mutual Improvement Societies, Literary Unions, &c. &c., of Great Britain, Ireland, and America.* By J. W. HUDSON, Ph. D., Secretary of the Manchester Athenaeum. Longman and Co.

4. *Lectures delivered before the Society of Arts on the Results of the Great Exhibition at the Suggestion of H.R.H. Prince Albert.* David Bogue.

5. *A Catalogue of the Articles of Ornamental Art, selected from the Exhibition of the Works of Industry of All Nations in 1851, and purchased by the Government.* Published for the Department of Practical Art, by Chapman and Hall.

6. *Official, Descriptive, and Illustrated Catalogue of the Great Exhibition of the Works of Industry of all Nations.* By Authority of the Royal Commission. Spicer and Clowes.

7. *Report of Conference between the Society of Arts and the Representatives of Literary and Scientific Institutions and Mechanics' Institutes on 18th May, 1852.*

8. *The Introductory Lectures delivered at the Opening of New College, London.* Jackson and Walford.

IT is ever interesting to trace the progress of human knowledge, and to note the new applications of the truths which man elicits from nature, to aid his advancement and increase his pleasures. As life is manifested by pulsation and vital energy by impulsive throbs, so mental progress is indicated by undulations, and every great advance appears as the line of light gilding the crest of a tidal wave; which, in obedience to universal law, moves forward by a series of successive elevations and depressions.

At one period we find the human mind exercising itself in wild and poetical imaginings, and explaining the wondrous operations of nature by the existence of spiritual influences, which are idealized, in obedience to the prevailing superstitions of the time. At another period, we discover man employing his senses in diligently seeking out the truth, and, by close observation, endeavouring to detect the secret springs of the phenomena which have attracted his attention. In the first epoch we have a poetical, in the second a mechanical philosophy. Eventually,

the necessities of civilization impel every thinker to study the means of applying the powers of nature to do man service, and to mould the organic and the inorganic kingdoms to meet the necessities of human life. In each condition the elements of progress may be observed, but in the combined operation of the three, we discover the greatest exaltation of human intelligence, and consequently the more rapid advancement of art and manufacture among nations.

Never was the desire for intellectual advancement more strongly expressed than it is at the present time: the expression, however, indicates but one line of direction, and that is, the useful applications of science. Chemistry and electricity have produced, and are still producing, the most remarkable revolutions which the world has ever witnessed; and heat and light are, by the magic spell of science, compelled to minister to the useful, and create the beautiful, at the solicitation of man, the evocator. From what we have done, we are led to believe we may do more. We pass our words over the land with the velocity of the thought. We will not allow the sea to check us, and the British and the Irish Channels are made to hold the conductors which convey our lightning messenger. Already we talk of spreading our wires on the bed of the vast Atlantic; of uniting Europe with America: we contemplate an electric communication with Hindostan: perhaps, even now, there are dreams of spanning the bed of the Pacific Ocean—of actually girdling the ‘great globe itself;’ and thus, by the agency of a physical force, of chaining in one bond the entire human family. We go fast in these modern days. Express trains are running on other lines than the railways of Birmingham and Bristol. Human thought, propelled at high pressure, strives to achieve, in a short day, more than was done in a long life by our ancestors. There is, we fear, overmuch excitement in our mental progress, and while boasting of our rapid flights, we forget that we have passed many a bright spot unnoticed.

It becomes important that we slacken speed—that we observe, instead of speculate, or the wreck of our hopes will be the result of our rapid race. The Great Exhibition appeared the culminating point of one great epoch in the history of man’s industry. Never was there any human gathering in which was manifested so strongly the mighty influences of an overruling Providence. When before were all the nations of the earth to have been persuaded to exhibit their works of industry, and display the results of each successful effort of thought? Not in the times of Egyptian sovereignty, of Grecian sway, or Roman supremacy. Certainly not in the days of a Charlemagne, or in

those of the Norman conqueror. In the days of the Plantagenets it could not have been—the Protectorate of Cromwell could not have achieved this task. Under the mild sway of an illustrious lady, and at the whisper of the prince consort, the ends of the earth awake, and, in honourable emulation, lay at the feet of England's queen their triumphs over nature, and submit their works to the judgment of her juries. This wonderful phenomenon has become the matter of history; but the greatest results, the indirect influences of the mighty gathering, are only now beginning to be manifest amongst us. In the passages of the Crystal Palace, the hard-handed mechanic learnt the lesson of his deficiencies as a workman; and the man of thought saw the points in which the English manufacturer fell short of excellence. Hence there has arisen on the one hand a desire to learn, and on the other a willingness to instruct. But then a problem of somewhat difficult solution presents itself on both sides—How shall the mass of busy workmen learn? How can an industrial education be diffused?

The surplus fund of the Great Exhibition, amounting to at least 150,000*l.*, it is now decided by Prince Albert and the royal commissioners, shall be devoted to a system of industrial instruction. A metropolitan centre is to be formed, which will, it is hoped, ramify into every section of the land. The surplus fund, however, large as it is, cannot effect all this; the nation must aid in the great work, and that aid, we have sufficient evidence to show, will be given ungrudgingly.

Sections of this industrial institution already exist. We have the Museum of Practical Geology teaching all the methods by which the inorganic world is moulded to man's use; and in the Government School of Mines a system of purely practical instruction is successfully going forward. The lectures given at this establishment to working men are another pleasing evidence that our government is awakening to the necessity of practical education. In the Museum of Practical Botany at Kew is the interesting nucleus of a most important illustration of the value of the vegetable kingdom to man. And in the Museum of Practical Art, recently opened in Marlborough House, we have well-selected illustrations of the art of design and of the philosophy of harmonious colouration, obtained chiefly by purchase from the Great Exhibition. These establishments will be brought to bear, each one in its speciality, on the grand scheme of industrial instruction to which the Great Exhibition has given rise; and though at present occupying different localities, they will work with a common object, and in reality represent several members of one body. Again, the Society of Arts, zealous in

the good work which they have hitherto performed so well, plans a system of statistical record which must be of the greatest value in a commercial country like England, and they are attempting a system of union amongst the Mechanics' and Literary Institutions, which shall in every way enlarge their scale of usefulness, and lead to the improvement of those upon whom rests the production of increased efficiency in the implements and machines upon which the perfection of British manufactures depends.

The influences of this movement have penetrated the almost monastic seclusion of our ancient universities, and the report of the Oxford University Commission is a most important document, proving that enlarged and liberal views of education are taking possession of those high places of learning which have hitherto confined their attention to the dignity of classic lore, exclusive of those subjects which are of the first importance to a commercial and manufacturing people. Let it not be supposed for a moment that we have any desire to banish Homer or Horace from the schools, and set up Bacon and Berzelius in their places; but we are daily taught by the necessities of our position in the ranks of civilization, that we must learn to know *things* as well as *words*, and that a *natural* education must take its place by the side of that system of tuition which is especially *artificial*. Professor Edward Forbes, in his introductory lecture at the opening of the Government School of Mines, has the following excellent remarks on this subject, which, although applied in this instance to natural history, may be applied with yet greater force to chemistry and the physical sciences, involved as they are in every kind of manufacture and each branch of practical mechanics.

'The value of natural history as an educational science has been but partially recognised in Britain. In our schools and colleges the chief cultivation has been directed to the nurture and training of the memory, the reasoning powers, and taste, not always by the most judicious methods. Observation, a faculty upon the correct exercise of which the value of the others in a great measure must depend, has been neglected, or even entirely ignored. Yet to observe truly, to note accurately, are surely qualities of essential importance to the well-being and future prospects of every youth. The successful progress of a man through life, the weight attached to his statements, must, in a great measure, depend upon them. The simplest, easiest, and most beneficial method of cultivating the observing powers, lies in the acquirement of the methods and practice of the natural history sciences. Ignorance alone could have excluded them from recognised courses of education. Though partly taught in some of our universities, it is, as branches of knowledge, usually in connexion with the

enlightened profession of medicine, and not on account of their value in educational training. Of late, however, there has been a tendency to rectify this. Oxford and Cambridge have recognised, in theory at least, the right of natural history to share in their honours. Their younger sister, London, with the timidity of youth, has hesitated to pronounce in its favour. In the metropolitan colleges, and the universities of Scotland and Ireland, the natural history sciences are taught by able professors; but the total number of their unprofessional disciples is small, and cannot be said to be increasing. In schools of lesser grade they assume, when professed to be taught at all, the form of intellectual recreations, not that of exercises and strengtheners of the mind of the pupil. The time, I trust, will yet come when every student will be required to educate his observing powers through the agency of these delightful branches of study.

'The earliest efforts of infant intellect are directed towards the observation of natural objects. Animals, plants, minerals, are collected, by the schoolboy, who delights to note their shape and qualities, and rudely to compare and classify. But the thirst for natural knowledge thus early and unmistakeably manifested is rudely quenched by unpalatable draughts of scholastic lore, administered too often by a tasteless pedagogue, who, blind to the indications of a true course of education, thus plainly pointed out by human nature, developing itself according to the laws of its own God-given constitution, prunes and trims, binds and cramps the youthful intellect into traditional and fantastic shapes, even as the gardeners of a past age tortured shrubs and trees into monstrous outlines, vainly fancying to improve their aspect, arresting the growth of the spreading boughs and the budding of the clustering foliage, mistaking an unhealthy formality for beauty. Far be it from me to disparage the educational value of the glorious literature of Greece and Rome, or to withhold due honour from the many able and learned men who give dignity to their profession as educators. To them I would appeal for the rectifying of the evils of a one-sided education. I would implore them, in the name of Aristotle, the greatest of naturalists and most admirable of observers,—how great otherwise none know better than they do—to avail themselves of that science upon which he laid so much stress, and, through it, to cultivate those tracts of the mind of youth that now lie fallow and unproductive.'—*Record of the School of Mines.*

Such are the evidences of the operation of that feeling, so strong as to be apparently irresistible, which is now manifesting itself in a general expression of the pressing necessity for the immediate adoption of a grand system of industrial instruction.

INDUSTRIAL INSTRUCTION—do we attach a correct meaning to the term? Do we all agree, at least, in giving the same definition to the expression so generally adopted? These are questions which it is important to ask, because we feel that the thinking public are not furnished with sufficient evidence to

enable them to determine. Having examined with great care all that has been written and much that has been said upon this subject, we are compelled to confess ourselves still unable to define, with that exactness which we could desire, the object it is proposed to comprehend. We know that a class of earnest and honest men advocate the establishment of great training schools, in which instruction in every variety of handicraft shall be given by those best qualified to impart such knowledge. Excellent as is the idea, we do not conceive it to be possible, at present, to carry it out, and the failure of the plan in mechanics' institutions must not be forgotten. Again, we find another class who, fearing that the labour of instructing the adult population would not be advantageously employed upon those whose habits were fixed, and thoughts already bent into some definite direction, propose to devote all their energies and all the appliances they can bring to aid them, in giving to the young the necessary scientific education for enabling them to avail themselves of its discoveries. The importance of this no one can deny, and every year improves the system of education which we adopt for our children.

There is still another section warmly advocating industrial instruction, but who appear to limit it to a system of adult education by lectures of a popular, though practical character, not very dissimilar from the present practice of a well-conducted mechanics' institution. On this point we may quote a passage or two from the published letter of Mr. Harry Chester, to the Society of Arts:—

‘The Exhibition has given us some very significant hints that it is not only the education of our poor children that needs to be improved; high and low, rich and poor, old and young, have all an education question to be solved, have all a very real and urgent need of knowledge, and of a knowledge of that kind which a literary and scientific education, if fully developed, is well calculated to assist in affording.’

Mr. Harry Chester then intimates that certain experiments carried out by the Highgate Institution, particularly in reference to cottage gardens and allotments, have been eminently successful, and then proceeds:—

‘I need not point out how rapid a progress would be made, in all parts of the country, in improving the dwellings of the poor, in sanitary measures and in the use of scientific inventions, if the local institutions throughout the kingdom could be led systematically to aim at those very important objects. Questions also of political economy (not politics) and social law, I conceive, should be treated in the theatre of these institutions. How much the passing of useful laws would be facilitated if this were the case! Not to be tedious, I would instance

the laws of partnership, of bankruptcy, of patents, of master and servant, as suitable for discussion by competent persons in such places. And again, how little are the great mass of the middle classes acquainted with the useful inventions which (*e.g.*) receive medals from the Society of Arts! Why should not these be systematically introduced to the notice of the institutions?

The large number which appeared to accept, *in general terms*, Mr. H. Chester's idea may be inferred from the numerous attendance of delegates at the conference on the 18th of May, when 300 men from all parts of the country, representing mechanics' and other institutions, met and dined together. We shall presently examine, with some minuteness, the movement of the Society of Arts towards improving the efficiency of the institutions of the United Kingdom. With these dissimilar views—all leading, it is admitted, to a common end—is it not to be feared that much of that usefulness which would result from a combined movement upon a well-defined object will be lost? Even the most zealous friends of the movement to which our attention is now directed may, by creating dissimilar interests, produce a conflict which may defeat the objects intended. Let all the advocates of the establishment of a great national system of industrial instruction confer together. Let it be fairly determined what plan shall be adopted, so that we have no division of interests. The establishment of a museum is quite decided on by the royal commissioners, the nucleus being formed by the collection given by the exhibitors at the conclusion of the Great Exhibition, which is for the present lodged in Kensington Palace. We have already stated the existence of three national establishments similar in their character—the Practical Museums of Geology and Botany and the Museum of Practical Art. These must not long exist as separate establishments. We already see in the collection at Marlborough House and in that in Jermyn-street articles similar in character. Metal manufacture and productions originating in any raw material forming a portion of the earth's surface, naturally belong to the Museum of Practical Geology; and we find in this collection glass, porcelain, and ordinary pottery, with a very fair exemplification of the history of these particular manufactures. The metals in every state—from the raw material, or ore, as taken from the mine, to the most perfect piece of cutlery, or the most artistic bronze—have here a place. The catalogue of ‘the articles of ornamental art’ purchased by the Government for the department of practical art, instructs us that the Marlborough House collection contains ‘silver and iron utensils;’ ‘oxidised silver caskets;’ ‘hunting-knife’ (purchased at the great price of 200*l.*); ‘chimney-piece—terra

cotta ; 'cast-metal candlesticks ; ' flower vase ; ' and 'tiles for walls and stoves,' &c. Beyond these there are numerous articles in electro-plate, and bronzes, all which belong to, and are to be found in, the Museum of Practical Geology.

We do not for one moment deny the advantages which are to be derived by the students of the Schools of Design from the collection of the finest productions of art—manufacture and works of the highest art. There is a peculiar condition of mind induced by the study of the truly beautiful, which tends to correct those irregularities of taste which are too frequently induced by the necessity—as it is thought to be on the part of the manufacturer—of catering to that desire for novelty which the public express. The School of St. Peter, at Lyons, was founded about the middle of the last century expressly for the instruction of draftsmen engaged in preparing patterns for the silk manufacture of that city. The school was disorganized, but by a decree of Napoleon it was restored. It then became an academy of fine art, to which, as a subordinate branch, the study of design for silk manufacture was attached. On this Mr. Dyce remarks, in his report on Foreign Schools of Design :—

'It appears that, on this account, all the students who enter the school commence as if they intended to become artists in the higher sense of the word, and it is not till they have completed their exercises in the drawing and painting of the figure from the antique and the living model, that they are called upon to decide whether their future pursuits shall tend towards design for industry, or the production of works of fine art. This circumstance, among others, to which I shall have reason afterwards to allude, will account for the well-known fact, that the same individuals in France are frequently engaged in both pursuits.'

'In a review of the method of instruction adopted in the school of Lyons, so far as it is connected with manufacture, it appears to me to exhibit the true principle on which a school of design ought to be constituted, whether it confine itself to one branch of industry, or extend its operations over the whole field of ornamented manufacture.'

At the same time, however, as we admit the importance of collecting such objects as those we have named, we cannot but express ourselves strongly on the fact of creating two national establishments for the exhibition of the same class of manufactures. The public good—the instruction of the public in 'practical art,' or in 'science applied to the arts'—is the professed object of each establishment, and the completeness of either will be prevented if they both occupy the same ground. There is ample room for the exertions of both sections, but they must have a common object in their labours. What we think

necessary is, the amalgamation of such collections as those of the museums of Marlborough House, Kew Gardens, and Jermyn-street, into one grand display of manufactures in its widest acceptance.

In examining the operations of any central school of instruction, we are at once struck with a difficulty, which applies with equal force to the 'Government School of Mines,' and to the 'Department of Practical Art,' and to the 'Schools of Design.' Even supposing the education given in these establishments free of all—or at a merely nominal—charge, the expense incurred by the required residence in the metropolis presents a barrier to their usefulness. The establishment of branch institutions in particular localities will meet the difficulty but in part; since it is impossible to bring the advantages home to every man's door; some will still be left to incur the cost and inconvenience of living from home.

We have been led to understand that local schools of mines are about to be established in several mining districts—that these will be in some way connected with the central institution, and that the students of most intelligence in these will be, from time to time, drafted to the metropolitan school, the expenses of education, &c., being defrayed by scholarships. Of these we have the first example set in the establishment, by the authority of her Majesty, of the Duke of Cornwall's exhibitions, to be competed for by examinations of the matriculated students of the School of Mines at the termination of their first year's course. These have this year been awarded to Mr. Blanford and Mr. R. Hunt, two of the students of the Government School. By a large extension of these exhibitions it may be possible to reduce the difficulties to which we have alluded to a minimum.

The *Ecole des Mines* of Paris may be quoted as an example of the successful working of a mining college remote from a mining district; and in the lectures which were given by the professors at the opening of our Government School of Mines, the advantages of that knowledge to the practical miner, metallurgist, and manufacturer which was not to be obtained independently of a rudimentary scientific education, were ably dealt with.

Sir Henry De la Beche, in his inaugural address, says:—

'Let it not for a moment, however, be inferred that we do not regard practical knowledge as of the highest importance, even in cases where those possessing it may not also possess the power of satisfactorily analyzing it. Facts brought to light by practice, are to general progress that which experiments are to experimental philosophy: they have to be properly explained by the best methods

at command, after they have been satisfactorily proved to be facts; a matter of no slight importance, seeing that so many things, so termed, are not such. We only desire that all interested should have the power to discriminate between sound and unsound views, so far as existing knowledge may be available—taking all care not to neglect or depreciate the information afforded by those whose opportunities may not have sufficiently advanced their power to analyze and extend it. We should recollect how rapidly the science of our time has increased among the most instructed, and with it the power of its extension and application in directions not dreamt of by our forefathers. As some reason, right or wrong, is sure to be assigned for every practice, it is most important that those connected with it should possess the existing knowledge upon which it rests. It becomes a national duty to assist in collecting that knowledge for them, especially when widely scattered. For the purposes contemplated at this establishment, facts, bearing upon the teaching proposed, are to be sought far and wide, among various other nations, as well as in our own. That there is an increasing feeling among those most interested, that successfully to apply a science requires both a knowledge of that science and of the subject to which it is to be applied, and that wherever there is a want for promoting the combined information it should be supplied, our daily experience shows.

'Those whose duties or inclinations take them among our industrial population, can scarcely fail to observe how much the term *practical* is becoming appreciated in its true sense. Indeed, the difficulties which the instructed in that population have to contend with from the uninstructed, can scarcely otherwise than lead to correct views on this head. It is the duty of all to assist in affording to those whose minds are alive to every application of knowledge, the power to acquire that which they are desirous of applying, so that they may possess the means of analyzing their practice successfully for general progress and the public good. The more real knowledge is diffused, the more will effective practice be increased. Science and practice are not antagonistic, they are mutual aids. The one advances with the other. Civilization advances science, viewed in all its strictness and height; and science, by its applications, advances civilization. Steadily bearing in mind these truths, as we conceive them to be, it will be our earnest endeavour at this institution to be useful, as far as our powers and abilities may permit, in promoting the progress of those for whom our teaching has especial reference; trusting, at the same time, to supply a national want, and, by so doing, assist in advancing the general good of our country.'—*Records of School of Mines.*

We have already a central school of design, less efficient than it should be, and numerous local schools deriving some advantage from the metropolitan centre. Similar establishments might be created in the manufacturing and mining districts, placed under the general superintendence of the Government School of Mines

and of Science applied to the Arts, which might thus be made to fulfil a great mission of usefulness.

As we have already said, every educational institution now recognises the necessity of practical scientific instruction; and, in most of them, we find special appointments for lectures, and other means of imparting a knowledge of natural philosophy.

The remarks of Dr. Lankester, on the opening of New College, London, have much import in them. They convincingly show that even those to whom the charge of instructing for the ministry of the gospel is committed, are alive to the advantages to be derived from the study of the natural sciences.

'Although the importance of the study of the natural sciences is now too generally recognised to need a formal defence, yet the recent institution of a chair of natural history in New College may be regarded as a favourable occasion for vindicating their claim as part of a sound general education, as well as considering their connexion with theological studies. That the various branches of knowledge comprehended under the term natural history, have not been more generally made parts of a complete education, may be accounted for by the fact of their recent rapid development, and the almost entire ignorance of them amongst the Greeks and Romans from whom we have derived the elements of our early civilization.

'We must not, however, regard either their recent developement, or the want of knowledge of them amongst the nations of antiquity, as proofs of their valuelessness, as means for a complete general education. The reason of the late development of the inductive sciences, as compared with the knowledge of language, and the rules of abstract science, will be found in their own nature. The child acquires much earlier the habit of using language, and the properties of numbers, than the habit of observing and arranging the facts of external nature. So, amongst the nations of antiquity, language and mathematics early attained a perfection which has ever since rendered them the readiest instruments of education.

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'Constituted as English society is at the present day, it ought not to be a matter of indifference as to whether the observing powers of the mind are rightly trained. Much of the greatness of this country, and her power of exercising good and evil influences, depends on the development of her material resources, those very resources which it is the function of natural science to contemplate as the facts for its general principles. It is only as England derives increased aid from the chemist, the natural philosopher, the anatomist, the botanist, that she can maintain her manufactures and her commerce. It is only as she increases her wealth by these, that leisure can be afforded from necessary labour, whereby the mind can be cultivated, the feelings directed, and the blessings of religion and civilization be felt throughout all ranks of society.'—*New College Introductory Lectures*.

We have now given, from dissimilar sources, the evidences which prove the growing feeling that English industry must be properly sustained by industrial instruction. Great as our advances in the arts of peace have been, we have learnt from the Great Exhibition that there are numerous points in which we are inferior to the foreigner, and in some, as in the principles of design, and the science of coloured harmony, we are lamentably ignorant. With a view to instruct us upon those points in which we have a great lesson to learn; Prince Albert suggested to the Society of Arts a series of lectures, in which the remarkable features of each section of the Exhibition should be clearly brought forward; peculiarities of manufacture or construction considered, and the direction in which the efforts for improvement should be made clearly pointed out.

Although these lectures were, for the most part, undertaken by men of eminence, the object for which they were instituted appears to have been, in almost every case, lost sight of, and they are little more than catalogues, with enlarged annotations, of the Exhibition; many of them being, indeed, just the reports of the jurors, and nothing more. There are a few exceptions to this—but they are indeed very few. One fact we gather from them, and that is the importance with which every lecturer regards the establishment of industrial schools. We might make many selections in proof of this, but we prefer confining ourselves to one passage from the lecture of Mr. Hensman, who so ably superintended that section of the Exhibition which was devoted to machinery.

'With regard to the question of industrial schools now much talked of, it is quite evident that among our mechanics there is often a very great want of sound information, and any means that will impart this to them will be attended with great good; but in my own experience, I find that few people give time in the day to it, and among those who devote the evening to the purpose of study, technical instruction is generally neglected by them for the more amusing pursuits of literature. This will be found the case in mechanics' institutions generally, where, of all places, we might expect to find it otherwise; and in the few cases where mechanical science is studied by those engaged in engineering, mechanical publications seem more in demand than lectures. Unlike chemistry in its laboratory, or design in its schools, useful practice cannot be followed out, except on so large a scale that the factory or out-of-doors works are the only means available. . . . For these reasons, in any industrial schools that may be established, I think it will be found that for some time to come, so far as engineering is concerned, money will be better laid out in the library than the lecture room; and, indeed, with a few bright exceptions, we have not

many men who possess both the will and the power to keep an audience constantly attentive on these subjects. Since the foregoing paragraph was written, the lectures to working men at the Museum of Practical Geology have begun, and admission is obtained at a very low rate. I am informed that they are very fully attended, and I sincerely hope that they may be successful.'

This is the expression of an opinion on mechanics' institutions by one of themselves—a man thoroughly acquainted with the wants of the class of mechanical engineers, and other artisans; and is therefore, as such, of much importance.

This leads us to the consideration of the movement of the Society of Arts, with a view to the improvement of the condition of Literary and Scientific Institutions, Mechanics' Institutes, &c. Mr. Harry Chester truly says, 'There is now scarcely a town, or 'considerable village, which has not its institution under some 'form and name; but, with very rare exceptions, the institutions 'are generally in a languishing condition, both as to funds and 'as to usefulness. I do not mean to assert that they are of no 'use, but merely that they are not half as useful as they might be.'

On the 18th of May a conference between the Society of Arts and the representatives of the institutions took place—the Marquis of Lansdowne in the chair; several members of both houses of Parliament, some dignitaries of the church, and many scientific men being also present. About three hundred delegates attended; thus, by their presence, admitting the fact that an improvement was required. The Marquis of Lansdowne, Earl Granville, Mr. Strutt, of Derby, the Bishop of Oxford, the Earl of Harrowby, the Right Hon. T. Milner Gibson, Mr. Joseph Hume, and the very reverend the Dean of St. Paul's, addressed the assembly as movers and seconders of resolutions. Of these, but little need be said, although it appears to us to argue a narrowness of view on the part of the framers of such a resolution as that which was put in the hands of the Bishop of Oxford, to the effect, that these popular institutions were 'calculated to promote the interests of religion and morality.' Well might the Bishop of Oxford express a doubt whether it was necessary to maintain the proposition, and exclaim—

' My lord, I am not one of those—I hope their number is rapidly diminishing—who have any secret or unexpressed suspicion that there is any opposition between religion and the advancement of literature and science. I am not of those who believe that ignorance has any tendency towards giving people that greatest blessing, that they should be a religious nation. If religion be the heavenly gift from God, whereby man, that highly composite creation, is to be cultivated in his intellect, in his conscience, in his reasonable soul, to

the highest amount to which he can bear cultivation, there can be in the nature of things no contradiction between that which is to cultivate to the highest one set of faculties, and that which raises his other faculties to their proper pitch; nay, rather the highest development of the whole man must depend upon the equal application to him of all these several powers.'

This movement of the Society of Arts, started with a flourish of such trumpets, promises to pass away without effecting much to benefit the institutions of the country. The Exhibition was a great triumph to the Society of Arts, and in consequence there is now a little grandiloquence in all its attempts. There is no doubt but its intentions are good, but in several of its schemes it is evident that trusting to the Micawber system of hoping 'that something would turn up,' rather than digesting carefully its plans, has been the hazardous rule.

When we read, in Mr. Harry Chester's letter, which first awakened the Society of Arts to the wants of literary and scientific institutions, a suggestion for connecting them 'with the British 'Museum, the Association for the Advancement of Science, the 'Geological, Botanical, Zoological, and other societies, whose 'objects may fairly be considered to come within the scope of 'the institutions,' it is evident that gentleman rests in perfect ignorance of the constitution of these establishments, and of the organization of mechanics' and other institutions in general. This gentleman, the president of the Highgate institution, has been, without doubt, actuated by the most earnest feeling to effect a great good; and being a man of business habits, and much energy of character, he succeeded in organizing the conference, and giving it an appearance of dignity. But with the expression of the opinions of the noblemen and gentlemen present in favour of a system of instruction by popular lectures, the business may be said almost to close.

It is true there is a committee appointed by the Society of Arts for working a union of institutions; but, up to the present moment, there is no appearance of a plan by which such an union can be worked. It is important we should examine the conditions of these institutions, and the difficulties by which they are surrounded. There are about 750 institutions in the United Kingdom bearing the names of Literary and Scientific Institutions, Mechanics' Institutes, Athenæums, Mental Improvement Societies, and the like.

The mechanics' institutions were originally established for the instruction of working men in the arts they practise, and in those branches of science which are applied more particularly to the manufactures in the locality of the institutions. This has been

a complete failure, the object sought has not been realized in a single instance, and the mechanics' institutions have passed out of the hands of the artisans, and become the meeting places of the better middle classes. Lectures were at one time very popular, and they were then given in courses, and, to a great extent, were instructive. They have, however, suffered a lamentable decay, and single lectures, or courses of two or three only, are now usual. One week a lecture on science is delivered, and since it must be essentially popular, it not unfrequently happens that truths are told with very considerable adornment: then follows a lecture on literature; next, one on the drama; then, probably, a concert, or some entertainment of the lightest order. By this system, the institutions have been committing a self-slaughter—they introduce exciting food for the mind, and, like stimulants for the body, appetite for them increases. The result of this was exemplified in a speech from one of the delegates to the Society of Arts, who said, at his institution, when the best scientific lectures were given, five shillings were taken at the doors, but when any amusing matter was introduced, as many pounds were received. Acting upon this principle, the institutions have entered on a career of competition with the theatre and concert-room, in which they must eventually be the losers; and, the value of the lectures estimated by their power to draw paying audiences, the clown must beat the chemist at this. Indeed, all the institutions are now suffering from the consequences of their own folly and mismanagement. They were established as the means of adult instruction, and they have degenerated into theatres of amusement. We have now before us announcements from two of the most *successful* of the mechanics' institutions, that concerts will be given during their autumn course, in which Mr. Sims Reeve and his wife will appear. Lectures on music are eminently appropriate, provided the vocal or instrumental accompaniments are introduced as illustrations of the science of harmonics, the tendency of which is of the most soul-refining character. But the institution is not the place for a concert, and by accustoming the members to such excitements, healthful though they be in their proper place, the result proves that they unfit them for lectures of a purely instructive character, which are for the most part voted '*dry*'.

'It is interesting,' says Dr. Hudson, 'to trace the career of the popular literary societies of the country, and to compare their operations and their results with the expectations entertained by their first promoters. The founders of literary and mechanics' institutions assumed that these associations would effect three great purposes: *First*. The rapid promotion of general science by the greater number

of persons engaged in the observation of its phenomena. The lower ranks, who are chiefly engaged in manual labour, have frequent opportunities of making observations on certain peculiarities in the processes of art, which often escape the notice of observers of a superior rank, and thus the labouring classes of society would be rendered mutually useful in uniting and concentrating the scattered rays of genius, which might otherwise be dissipated and lost to the scientific world. *Second.* An extensive diffusion of rational information among the general mass of society. For by means of lectures and popular discussions, those narrow conceptions, superstitious notions, and vain fears, which so generally prevail among the lower classes of society, might be gradually removed, and a variety of useful hints and rational views suggested promotive of domestic convenience and comfort. *Third.* The creation of intellectual pleasures and refined amusements tending to the general elevation of character. The frequent intercourse of men of different parties and grades of life, for the purpose of promoting one common intellectual object, gradually vanquishing those prejudices and jealousies which almost universally exist, even in cultivated minds, is unquestionably an object to be cherished and encouraged. By such means, a taste for rational enjoyments may be produced, and those hours generally spent in listlessness and in foolish amusements, may be converted into periods rendered precious by the inculcation of enlightened and elevating principles. Habits of order, punctuality, and politeness, would be engendered, and flow from thence into all the other relations and departments of life.—*The History of Adult Education.*

In any attempts which may be made to introduce a national system of industrial instruction, the failure of this in the mechanics' institutions must not be forgotten. It was expected that much knowledge would have been derived from the observations of workmen: this has not been the case. Why? The answer is simple—they have never been taught to observe. The powers of observation require as large an amount of training for their development as any faculty of the mind, and this teaching *to observe* has been entirely forgotten. It appears to us that classes for cultivating habits of observation might be made by far the most attractive features of any institution, and might lead to the establishment of local museums which would be extensively useful. The several members, grouping themselves according to their tastes, might collect a large amount of useful information. To gather the flowers of every hedge-row, and the plants of hill and valley, determine their locality and period of flowering, should be the task of one class; to collect examples of the geology or mineralogy the occupation of others; the Fauna of the district might fall to the hands of another section, and so on. Then meteorology, archæology, and statistics would furnish

exercises for many others of the most interesting kind. And having been trained by studying in classes which should meet and determine all doubtful points, the artisan would be prepared to notice and register facts which, although constantly occurring in his own daily vocation, have been as constantly passed unnoticed.

The Society of Arts, as far as their plans have been developed, contemplate the division of the country into unions, the institutions of each district appointing their centre, this central institute being in immediate communication with the great central committee of the Society of Arts. The business of this metropolitan centre will be to register the names of all approved lecturers, their subjects, and their terms. The institutions within any union having determined upon the number of lectures they require in any quarter of the year, selected their subjects, and adjusted the order of these with the local centre, the secretary of the union communicates with the secretary of the Society of Arts, and he is to endeavour to adjust with the lecturers on their list, that they set forth on their itineration in such order, that within a set time their mission of instruction shall be performed to the 750 institutions of the kingdom. The only charge made to the institutions for this task of arrangement, is two guineas per annum—the president of the institution becoming a member of the Society of Arts. The promise to the institutions, as implied rather than expressed, was to provide them with lecturers of a superior class, and at a cheaper rate than they are now supplied with those of an inferior character. How this is to be effected does not appear. We find, upon careful inquiry, that the average price of lectures is three guineas; some few of the institutions pay five guineas, and several gentlemen of eminence refuse to lecture under this sum; but we find this is, even in their cases, greatly reduced by the number of lectures they made a free gift to institutions under some pressure of temporary difficulty. There can be no question but lecturers can be obtained who will lecture on science and literature at lower terms, but the necessity of engaging such lecturers has already been the cause of the diffusion of an immense amount of false science, and the cultivation of perverted taste.

The requirements of a popular lecturer are of a rare order. It is not sufficient that he possesses an exact knowledge of his subject, but he must have the power of communicating his knowledge to a mixed auditory, which is more difficult than the inexperienced in these matters suppose. A mere statement of facts very soon wearies; the correct enunciation of the truth must be associated with a pleasing delivery, much earnestness,

and such incidental reflections as shall lead those who have not previously attended to the subject, to make fair deductions and realise the bearing of any theory explanatory of the lecturer's views.

The power of doing this is confined to a limited number of men; many of our most eminent experimental philosophers are incapable of explaining any fact in their own science so as to be intelligible to a number of persons. Mere class lecturing is a far more simple affair, and there are few men who have had experience in these matters but would prefer giving fifty lectures to a class of real students, than five to the audiences of mechanics' institutions in general.

The character and qualifications of a popular lecturer are such as should ensure him an income of from 500*l.* to 800*l.* per annum, and for such sums as these a man should be expected to devote all his time to his duties. What will be the result of this? Having no time for investigation, or for studying in his department, whatever it may be, he necessarily falls back. He may go on for a period repeating himself, but in a few years he gets *stale*, he fails to interest, and becomes, in fact, worth less than one half what he was when he commenced his task. We are perfectly aware that many men have travelled for years, and are now travelling, through the country, lecturing on science, many of them having valuable sets of apparatus. To these very men we do not scruple to refer our remarks, and that with no disparagement to them, as proofs that the science they teach is in the rear of the science of the day. We will take an example even from a popular metropolitan institution, where lectures on science are given daily throughout the year, and there we find, as the consequence of this constant iteration, that it is impossible for the lecturer to do more than give a rough outline of novelties, often coloured too highly for the truth.

We learned that the most eminent of the lecturers on science in the metropolis have hitherto refrained from taking any part in the movement which the Society of Arts has originated, assigning as a reason their want of confidence in the committee as at present constituted.

That some improvement must be made in the popular institutions of England is certain. They have done much good, and the general diffusion of useful knowledge, and the almost universal desire for improvement which is manifested throughout the length and breadth of the land, are mainly due to mechanics' and literary institutions. Although it appears imperative that something should be done to advance the institutions to that position of usefulness demanded by the advances of the age, we

are doubtful if it can be effected by the organization of all into a general Institutes Union. The experience of Dr. Hudson was great on this subject, and we now draw attention to his remarks.

‘One cause of the failure of too many unions arises, no doubt, from their having been too highly regarded by the managers of individual societies, who were led to anticipate great benefits from the unions, forgetting that the power of the association is contained in the extraction of means of usefulness from the institutes themselves; and whenever the unions have induced the individual societies to tax their funds, as far as expensive lectures, the depressing effect lingers for a long period, and reacts upon the association itself. The Yorkshire Union, in its infancy, was nearly destroyed by a similar course of proceeding. In Ireland, wherever Government aid has supplied the lectures, the same results have followed, owing to the matter, length, and manner of the lectures being, if not antiquated, at least totally unsuited to the taste of the public. The committee of the Northern Union have expressed their conviction that the reading of manuscript lectures forms a more social and beneficial means of instruction, by discussing the question at the conclusion of the paper, than the formal system practised by professional lecturers.

‘Literary, mechanics’, and other adult educational societies, are constituted on self-governing principles, and they recognise, as a general rule, no other authority than their own selected administration; thus, while they preserve their independence of action in their connexion with unions, they co-operate rather from the confidence they repose in the managers of the associations than from any conviction of its value and importance. The attempts to form a central union have always been restrained by a judicious caution, from a knowledge of the tendency of the larger unions to break up into sub-unions.’

It has been suggested that Government influence might be brought to bear advantageously on an union of institutions:—

‘Should a great central union,’ says Dr. Hudson, ‘be carried out under Government auspices, it must, to succeed even for a brief period, be based upon such regulations as will effectually disarm the just suspicions of the advocates of voluntary education, and subdue those glowing anticipations of extraneous aid in the shape of golden grants, which the mere name of an educational minister of state and a national board cannot fail to excite. On the whole, then, the experience of the past is proof of the danger of Government influence, and of the instability of extreme centralization, while it affords conclusive evidence of the superior and enduring value of voluntary efforts.’

We have endeavoured to give a sketch of the efforts which are now making to give an improved tone to the educational movement in this country, particularly referring to the applications of

science. There is no one section of manufacture which may not be improved by a more perfect knowledge of the materials upon which human industry is exerted. In every branch both material and labour may be economized, and the manufactured article consequently produced at much less cost than at present. Art, again, is in the very infancy of its application to manufacture amongst us, and future generations will, when they examine the forms of our fistic and metal manufactures, and the ornamentation and colours of our textile productions, be disposed to place the present age as one still low in the scale of refined civilization. The business of industrial instruction, is now fairly commenced in the Museums of Practical Geology and Practical Art. In the Government School of Mines and of Science applied to the Arts, and in the Department of Practical Art, we hope we have institutions destined to be the centres from which an enlarged system of education shall go forth, and that the manufactures of England, through their agencies, may be produced for the markets of the world, of the highest degree of excellence, and with the utmost economy of production. Beyond this, the system of instructing our workmen in the art of design must, if efficiently carried out, end in adding to the perfection of British manufacture that charm of the beautiful which soon extends its influence to the morals of an enlightened people.

ART. VI.—*Life of Lord Jeffrey, with a Selection from his Correspondence.* By Lord Cockburn. Two vols. 8vo. Black, Edinburgh. 1852.

The material incidents in the life of Lord Jeffrey go within a small compass. He was born in Edinburgh in 1773, and received his early education in the High School of that city. In 1787 he became a student in the University of Glasgow, from which place he removed, in 1791, to pass a portion of that year as an inmate of Queen's College, Oxford. He then returned to Edinburgh, and three years later, in the twenty-first year of his age, he was called to the Scotch bar. His success was so limited, that in 1801, when he married, his income from his profession had never exceeded a hundred a-year. In 1802 Jeffrey stood committed, with others, in the starting of the *Edinburgh Review*, of which journal he soon afterwards became editor, retaining that office until 1828. In 1830 he became Lord Advocate, and obtained a seat in the House of Commons; and in 1834 he took his place

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